

**ARAMIGUS URUGUAYENSIS**  
**(COLEOPTERA: CURCULIONIDAE), A NEW SPECIES**  
**BASED ON MITOCHONDRIAL DNA**  
**AND MORPHOLOGICAL CHARACTERS<sup>1</sup>**

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**ABSTRACT:** *Aramigus uruguayensis*, new species, occurs in Uruguay (Departamentos de Rocha, Canelones, and Maldonado) and includes bisexual populations as well as parthenogenetic lineages. Females are similar to the *pallidus* morphotype of *A. tessellatus*, but they are smaller and have a distinctive spermathecal duct markedly widened in proximal one-third; males have aedeagi that are similar to those of *A. intermedius*, but with shorter apodemes. The mitochondrial DNA haplotypes of *A. uruguayensis* are sharply differentiated ( $\geq 4.8\%$ ) from any other species of *Aramigus*.

*Aramigus* Horn (Entiminae: Naupactini) currently includes seven species originally distributed in Brazil, Uruguay, and Argentina (Lanteri & Díaz 1994). The genus has been the subject of several taxonomic studies (Lanteri 1986, Lanteri *et al.* 1987), including a recent revision and cladistic analysis based on morphological characters (Lanteri & Díaz 1994), as well as a mitochondrial DNA (mtDNA) study focusing on the relationships of the parthenogenetic lineages within the *A. tessellatus* complex (Normark 1996a). The species *A. tessellatus* (Say) has the largest geographical range and has been introduced in Chile, Mexico, and the United States (Lanteri & Díaz 1994). *Aramigus tessellatus* is a complex of several parthenogenetic lineages and one sexual lineage (Normark 1996a). Most of these are morphologically distinguishable and some were previously described as separate species. These distinct forms have more recently been informally designated as "morphotypes" of *A. tessellatus* (Lanteri & Díaz 1994). The parthenogenetic lineages of *Aramigus* appear to be polyploid (Normark 1996b).

In a recently submitted paper, Normark and Lanteri integrated the two sources of characters — morphological and molecular — to produce the most robust phylogenetic hypothesis for *Aramigus*. As a result of the analysis, they identified a group of specimens from Uruguay that appear to represent the sister species of *A. tessellatus*. This species is not well separated from *A. tessellatus* on the basis of morphological characters of the female, and was initially (Normark 1996a,b) considered to be morphotype of that species, in the sense of Lanteri &

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Díaz (1994). However, we recognize it as a separate species on the following grounds: (1) analysis of mtDNA sequences (Normark 1996a) and genome sizes (Normark 1996b) indicate that it is a distinct monophyletic lineage that includes both sexual and parthenogenetic sublineages, and (2) when both males and females are considered, the new species possesses a unique combination of morphological characters.

The purpose of the present paper is to describe the new species and to discuss the features that allow its separation from other species of *Aramigus*.

### *Aramigus uruguayensis*, NEW SPECIES

**Female** (Fig. 1). Small (length 5.5-6.5 mm). Vestiture usually gray; elytral scales directed backward; elytral setae pale, coarse, short and recumbent, slightly longer towards elytral declivity. Rostrum strongly truncate-conical ([width of frons]/[width of rostrum] about 1.80); rostral carinae distinct; rostral groove reaching apex of pronotum. Eyes convex; postocular constriction slight. Funicular article 2 longer than article 1. Pronotum lacking lateral depressions; apex and flanks curved; base not constricted and not thickened. Scutellum distinct, glabrous. Elytra moderately elongate ([length of elytra]/[width of elytra]: 1.53-1.66, mean 1.59; [length of elytra]/[length of pronotum]: 2.61- 2.93, mean 2.73); humeral tubercles absent; posthumeral constriction indistinct; apex subacute; elytral striae distinct. Denticles of fore tibiae small; corbel plate of hind tibiae moderately broad. Apex of sternum 5 straight.

**Spermatheca** (Fig. 2): Ramus moderately differentiated; prominence between nodulus and body moderately developed; about as long as, to longer than spermathecal body. Spermathecal duct long, usually curled, markedly widened in proximal one-third, narrow in distal two-thirds.

**Male** (Fig. 3). Smaller (length 5.3mm) and narrower than female, with more curved pronotal apex and more distinct posthumeral constriction. Apex of sternum 5 slightly excavated.

Apex of aedeagus acute (Fig. 4), curved upward. Aedeagus curved in lateral view (Fig. 5), about 2x as long as its apodemes. Lateral pieces of internal sac subparallel, more than 2x as long as central piece.

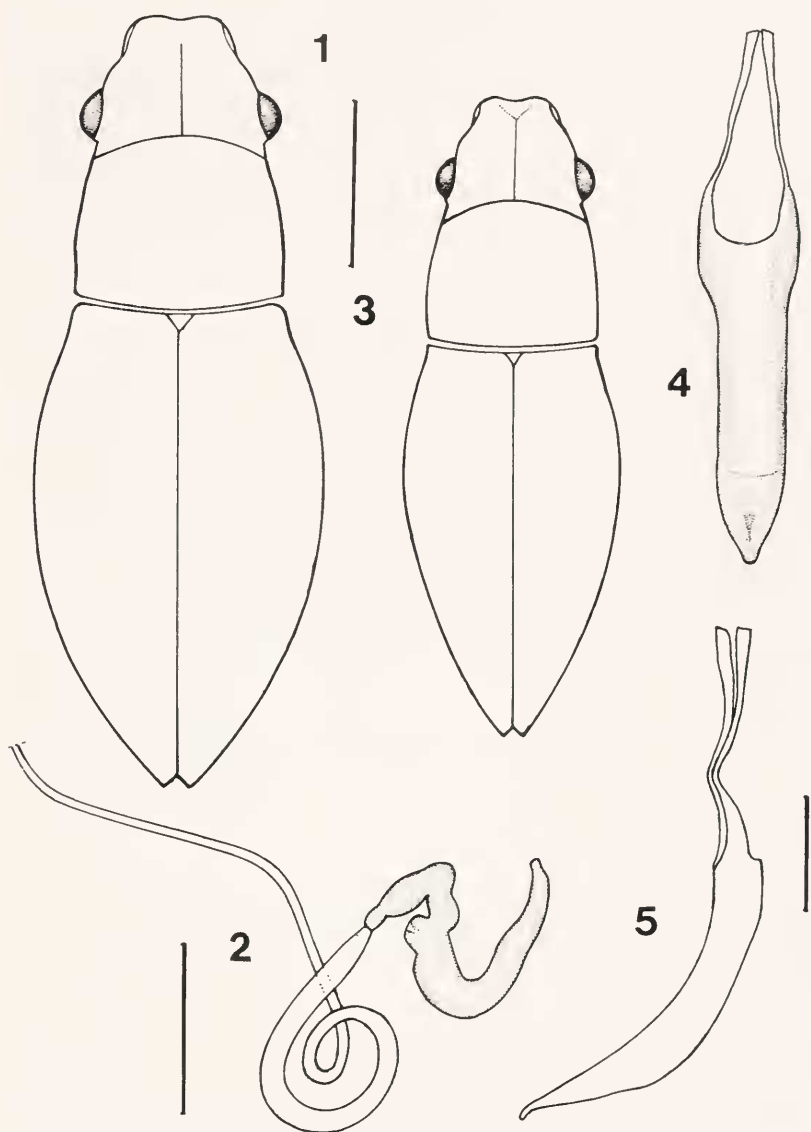
**Distribution.** The sexual population is known from a single locality, in the department of Rocha, Uruguay. Two other females thought to represent parthenogenetic lineages (Normark 1996a,b) have been found elsewhere in southern Uruguay, in the departments of Canelones and Maldonado. The type locality is Rocha, 8 km S La Coronilla.

**DNA.** A 762bp fragment of the cytochrome oxidase 1 gene, mitochondrial genome, was sequenced from 2 males and 2 females of the sexual population (Normark, 1996a). All 4 individuals had identical sequences, which have been submitted to GenBank under the accession numbers U25526-U25529. The sequences of the same fragment from the 2 putatively parthenogenetic females are somewhat different (1.1-1.3% divergent); these have been submitted under the accession numbers U25524, U25525.

**Type series.** Holotype: 1 female, Uruguay, Rocha, 8 km S La Coronilla, 10-I-1992, B. B. and R. D. Normark coll. 1192. Allotype: 1 male, same data as holotype, 1201. Paratypes: 3 females, same data as holotype, 1191, 1202, and 1193. Holotype and 1 paratype will be deposited in voucher lot #1223 of the Cornell University Insect Collection, Ithaca, New York, USA (CUIC); allotype and remaining paratypes will be deposited at the Museo de La Plata collection, La Plata, Argentina (MLP).

We designated a female as holotype to facilitate comparison with the many parthenogenetic lineages in the genus.

**Etymology.** The epithet "uruguayensis" refers to the country where the species occurs.



Figures 1-5. *Aramigus uruguayensis*: 1, holotype female, dorsal view of head, pronotum, and elytra; 2, spermatheca and spermathecal duct; 3, allotype male, dorsal view of head, pronotum, and elytra; 4, aedeagus, ventral view; 5, aedeagus, lateral view. Scales of 1 and 3: 1mm; scales of genitalia (2, 4, 5): 0.5mm.

## DISCUSSION

*Aramigus uruguayensis* was first identified as a distinct group of lineages of *Aramigus* on the basis of mtDNA sequences (Normark 1994). Analysis of 762 bp of the cytochrome oxidase I gene strongly supports the monophyly of this group of lineages (branch support or decay index 8; bootstrap 100%) (Normark 1996a; Normark and Lanteri, unpubl.). The haplotypes of *A. uruguayensis* are 4.8% to 7.8% divergent from those of *A. tessellatus*, and 9.1% to 12.4% divergent from those of other species of *Aramigus* whose mtDNA was examined (Normark 1994).

Based on external morphology, females of *A. uruguayensis* might be confused with some morphotypes of *A. tessellatus* (Lanteri & Díaz 1994), especially with the morphotypes *santafecinus* and *tessellatus*, and with form 1 or the *pallidus* morphotype. They look superficially like small individuals of the *pallidus* morphotype, and are quite variable in both the color of the vestiture and the morphology of the spermatheca and spermathecal duct — characters which are used to separate the different morphotypes of *A. tessellatus*.

The best character for distinguishing females of *A. uruguayensis* from *A. tessellatus* is the markedly widened proximal third of the spermathecal duct (Fig. 2). In the typical forms of the *pallidus* and *santafecinus* morphotypes, spermathecal ducts are not markedly widened at the proximal end and they are not curled (Lanteri & Díaz 1994, p. 140, figs. 56-58, 67). In the *tessellatus* morphotype, the spermathecal duct is narrow throughout its length (p. 139, fig. 44).

There is an atypical form of the *pallidus* morphotype having a curled spermathecal duct (Lanteri & Díaz 1994, p. 140, fig. 59), but it is distinguishable from *A. uruguayensis* by several morphological and mtDNA characters (Normark 1996a, Normark & Lanteri, unpubl.). Lanteri & Díaz (1994) found a few females with sinuous or curled spermathecal ducts markedly widened in the proximal one-third, which they treated as variants of the *santafecinus* morphotype (p. 140, fig. 68) in order to avoid the description of new morphotypes that were not well corroborated. Those specimens previously assigned to the *santafecinus* morphotype were collected in Uruguay, and we now believe that those specimens represent *A. uruguayensis*.

In contrast to the females, which are only weakly differentiated from female *A. tessellatus*, the males of *A. uruguayensis* have aedeagi that differ sharply from those of *A. tessellatus* males. In particular, the body of the aedeagus of *A. uruguayensis* is longer and more slender, and has a more acute apex than that of *A. tessellatus*. The aedeagus is also curved rather than straight in lateral view. The pieces of internal sac are long and subparallel as in *A. intermedius*, and not short and divergent as in *A. tessellatus*. On the whole, the aedeagus of *A. uruguayensis* is similar to that of *A. intermedius* (Lanteri & Díaz 1994, p. 138,

figs. 38-40) except that the length of the apodemes is relatively much shorter in *A. uruguayensis* than in any other species of *Aramigus*.

The type series is from the single known sexual population, found in the Department of Rocha, Uruguay. The isolated female from the Department of Maldonado (15 km E San Marcos) was found to be tetraploid by flow cytometry (Normark 1996b) and is hence hypothesized to represent a parthenogenetic lineage. This female, and another with closely related mtDNA haplotype from Canelones, are morphologically similar to females from the sexual population, and have mtDNA haplotypes closely related to (1.1-1.3% divergent from) that of the sexual population. These females may represent parthenogenetic lineages from a diverse *A. uruguayensis* complex that should be a subject of further collections and investigations.

The tribe Naupactini contains many other species that are like *A. uruguayensis* in that they appear to be complexes of sexual and parthenogenetic lineages (Lanteri and Normark 1995). Several of these parthenogenetic lineages have been introduced elsewhere in the world and are widely known as serious agricultural pests (e.g., Eggert *et al.* 1990, Soderstrom *et al.* 1993, Matthiesen & Learmonth 1994). Much less is known about their distribution and biology in their native ranges in southern South America. In the case of *A. tessellatus*, numerous morphologically distinguishable parthenogenetic lineages may co-occur, sometimes along with the sexual lineage (Normark 1994, 1996a). The existence of *A. uruguayensis*, whose range overlaps that of *A. tessellatus*, increases the richness and complexity of potential interactions between related lineages. There may be ecologically (and economically) important differences between parthenogenetic lineages, at least in *A. tessellatus*, since some lineages — and not others — have become agricultural pests (Lanteri 1994). This is potentially a rich system for studies of the ecology and evolutionary biology of sex and parthenogenesis.

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